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INDUSTRIAL EDUCATION





# INDUSTRIAL EDUCATION

A SYSTEM OF TRAINING FOR MEN  
ENTERING UPON TRADE  
AND COMMERCE

BY

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## PREFACE

**T**HIS series of books owes its existence to the generosity of Messrs. Hart, Schaffner & Marx of Chicago, who have shown a special interest in trying to draw the attention of American youth to the study of economic and commercial subjects, and to encourage the best thinking of the country to investigate the problems which vitally affect the business world of to-day. For this purpose they have delegated to the undersigned Committee the task of selecting topics, making all announcements and awarding prizes annually for those who wish to compete.

In the year ending June 1, 1905, the following topics were assigned:

1. The cause and extent of the recent industrial progress of Germany.
2. To what is the recent growth of American competition in the markets of Europe to be attributed?
3. The influence of industrial combinations upon the condition of the American laborer.

4. The economic advantages and disadvantages of present colonial possessions to the mother country.
5. The causes of the panic of 1893.
6. What forms of education should be advised for the elevation of wage-earners from a lower to a higher industrial status in the United States?
7. What method of education is best suited for men entering upon trade and commerce?

The present volume was awarded second prize.

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## NOTE

**W**HEN this essay was written the author did not contemplate the possibility of its ultimate publication; the subject is not so fully developed, therefore, as it would have been had that outcome been in mind. Treating in brief compass numerous aspects of a very comprehensive subject, it is no more than a series of suggestions. It is the hope of the author that there may result criticisms which will furnish him material and guidance in the preparation of a more exhaustive work on the same subject.

H. S. P.





**PART I**

**THE NEED OF A SYSTEM OF INDUSTRIAL  
EDUCATION IN THE UNITED STATES**



## I

### *A German View of the Strength of the United States in International Competition*

SHORTLY after the close of the St. Louis Exposition there began to appear in the newspapers of Germany accounts of the experiences, related before clubs and societies, of those who had visited the exposition.<sup>1</sup> These reports were more than the mere description of a world's fair. They constituted collectively an expression of expert opinion on the resources and industries of the United States, on the strength of the United States as a competitor in the world's trade, and especially as a competitor of the German Empire. As commissioners, exhibitors, manufacturers, and merchants, these travelers had not seized the opportunity to visit the United States merely for a summer's outing; they came as an unorganized intelligence bureau of the German people, seeking for information as to the real intent and power of this industrial rival. Their addresses, formal and informal, were their report to industrial Germany.

They confirmed previous accounts of the

<sup>1</sup> *Monthly Consular Reports of the United States*, Jan. 1905, p. 229.

vast natural resources of the United States, of the tremendous energy of its people, of the efficiency of its industrial organization, and of the extraordinary progress of the past two decades: they confirmed the impression that nature, in the wealth of physical resources she had bestowed upon a vigorous people, had created here a power to be reckoned with in the international competition of the future. But they assured their hearers, also, that any special anxiety on account of this competitor was quite unwarranted in spite of the many natural advantages which they enumerated. As offsetting the advantages, they pointed out certain disadvantages, obvious to themselves, of which, however, the people of the United States as a whole were apparently unconscious.

Of these disadvantages, especially significant was that common American temperament which they described as a state of careless confidence, a "feeling of complacent satisfaction with everything American"; a feeling that in industry and in commerce, as in other manifestations of national life, there is no need of conscious, concerted action looking towards improvement and greater efficiency. As one expression of this careless confidence, they cited the absence of special industrial education and the "reliance on a general and more or less superficial education, together

with natural adaptation." These educators, scientists, merchants, manufacturers, and engineers, constituting a body capable of passing judgment on all phases of industrial activity, advised their hearers to set their minds at rest, because of the neutralizing influence of this careless overconfidence in the advantages due to natural resources and geographical situation.

Americans should not allow these observations to pass without some serious consideration. Exaggerated though they may be, they should at least induce searching self-examination. Especially should they arouse us to a consideration of the specific charges, complacent satisfaction and an inefficient industrial education. It is the purpose of this essay to consider in detail the latter of these charges, with especial reference to the necessity of developing an adequate system of industrial education in the United States.

## II

### *Germany — Inferior Physical Resources compensated for by an Efficient System of Industrial Education*

INASMUCH as this study has been suggested by criticisms on the part of German observers of industrial conditions in the United States, it seems desirable in the first place to review briefly the experience which has given rise to the German critic's attitude of mind.

Present political Germany came into existence less than four decades ago, and although the establishment of the Empire marks the initiation of the present industrial policy, industrial Germany as we know it has developed mainly within the last two decades. Yet to-day Germany is one of the strongest competitors for international trade in the world's markets, surpassing the United States in spite of our incomparable resources, surpassing France in spite of that country's longer period of development, and having become a source of alarm to Great Britain in spite of the latter's better developed resources and the advantage of two centuries of commercial supremacy. Germany has achieved so much in so brief a time, be it noted, not

because of any extraordinary resources, nor merely because of her rapidly increasing population. Except in restricted areas, her climate is severe and her soils are poor. For the greater part of her raw material she is dependent on other countries. Meagre indeed are her resources as compared with those of the United States. Quite other factors than these have made possible her development into so formidable an industrial state, — factors that are social rather than physical. Two are worthy of special mention. One of these is a quality acquired through centuries of intensive labor, — the capacity for taking pains. The struggle for existence caused by meagre resources has developed, in place of careless confidence, a consciousness of the necessity of thorough labor wherever and however applied. The second factor that has been at the basis of the development of present industrial Germany is the paternalistic state. The paternalism of the German Empire, applied to the creation of industrial efficiency, has secured wonderful results from the limited resources given by nature to the German people.

Well established politically, Germany began to apply her centralized power to the development of industry. This expressed itself in many ways; in protective tariffs, bounties and subsidies, but in no way with



more energy than in industrial education, which was pursued with the inherited characteristic of thoroughness to which we have called attention.<sup>1</sup> Students of industry became the advisers of the Government; the scientists in the laboratories of the universities gave their services to agriculture and manufacturing; geographers and travelers studied with minuteness the physical characteristics of foreign countries; trade-schools were established for the development of skilled factory labor, and schools of commerce for the training of salesmen. Every resource of a paternalistic government was brought to bear to create efficiency, — efficiency in producing and efficiency in selling.

The result has been the rise within a quarter of a century of that new Germany which has taken its place as one of the great states competing in the markets of the world. The creation of this powerful industrial state has been due, be it noted again, not to superior natural resources, but to deliberate effort in the face of relatively inferior resources.

It is with the consciousness of what has been achieved by industrial education in the development of Germany that the visitors to the

<sup>1</sup> For a general comparison of Germany, England, and the United States, as to technical education, see Shadwell, *Industrial Efficiency*, vol. ii, ch. xvii.

United States, after their observations, advise their countrymen that there is no reason why they should not compete to-day on equal terms with the United States. The question arises, — did they observe correctly?

### III

#### *The United States — Efficiency of Superior Physical Resources impaired by Absence of Industrial Education*

HAD these German critics wished to give an analysis of the advantages possessed by the United States, they could have done no better than to adapt, as a distinguished French economist has in fact done, the analysis presented by our own Federal Census of 1900.<sup>1</sup> The industrial strength of the United States is to be attributed to five primary causes:

1. Agricultural and similar resources; in the production of wheat, corn, cotton, animal products, and forest products, the United States stands first.

2. Mineral resources; in the production of coal, iron ore and copper, basic materials of industry, the United States stands first, and in the production of the precious metals ranks with the leading countries.

3. The development and perfection of her transportation system, the United States possessing more miles of railroad than all the countries of Europe combined, and maintain-

<sup>1</sup> *Twelfth Census of the United States*, vol. 7, p. lvi, and Leroy-Beaulieu, *The United States in the Twentieth Century*, pp. xxii and 167.

ing lower rates than obtain in any other country.

4. Freedom of trade between all the states and territories, which combines into one commercial area regions as diversified climatically as Italy and Scandinavia, thus forming the greatest home market in the world.

5. A doubly selected population <sup>1</sup> possessing a freedom from inherited and over-conservative ideas; energetic, active, adventurous, but not undisciplined.

For a similar analysis of the disadvantages suggested, they might have offered the following:

1. The very prodigality of nature in this virgin region has made the acquisition of wealth so easy that there has developed, on the part of the American people, a liking only for the accomplishment of big things at whatever cost, — a wasteful disposition. Such a wealth of resources has been offered to the relatively sparse population of this extensive region, that nature has in effect borne the cost of this waste — as in the exploitation of forest resources — and this has developed a careless confidence. But now that the surplus of natural wealth has been generally appropriated, success must come to the individual, not

<sup>1</sup> Leroy-Beaulieu, *The United States in the Twentieth Century*, p. xviii.

as a matter of the mere further appropriation of nature's wealth, but by the creation of wealth by effort. Under these new conditions, a careless, wasteful disposition handicaps the American in his competition with more thrifty peoples.

2. The freedom from inherited and over-conservative ideas and the individualistic habit of thought of the settlers, accentuated by a physical environment which has promoted the success of *individual*, as opposed to *concerted* effort, has tended to cause self-reliance to degenerate into a state of mind approaching conceit, into a careless confidence in the success of all things American.

3. The physical wealth of the country has been so reflected in a high standard of living on the part of all classes, in large profits and high wages, that success in competition by the cutting of the wage-cost on the one hand or by accepting decreased profits on the other hand, can be accomplished only with great confusion.

4. The vast supplies of cheap power and cheap raw material have been already appropriated by a limited number of industrial explorers, and their future value already capitalized in "prospective earnings" and distributed by "business enterprise"<sup>1</sup> to the public.

<sup>1</sup> Thorstein Veblen, *Theory of Business Enterprise*, ch. vi.

To the great mass of enterprisers in the United States, therefore, their properties do not represent nature's bounty, but capital invested. Nature's bounty has been gathered in in advance, by comparatively few. For the great number of enterprisers, to conserve invested capital means to resist any considerable decrease in profits based on values partly artificial. The necessity of maintaining fictitious values is a handicap in international competition.

5. Notwithstanding their great system of public education, the American people do not yet possess, and do not seem to appreciate the value of, the most efficient human instrument for increasing competitive efficiency under given conditions of natural resources,—a system of technical education. This the Germans do possess, and it gives them an advantage in competition with the Americans.

In short, the German observers console themselves by recognition of the plain fact that now, except for a few world monopolies such as the mineral oil industry, the profit on invested capital for the individual producer in the United States is narrow; that the German or any other people, in spite of inferior natural resources, by careful, economical methods, by the development of the greatest skill not only in the fashioning of goods, but in the art of exploiting markets, may compete on equal

terms with a people possessing superior resources, but self-confident, complacent, and disdainful of effort.

What Germany relies upon under these circumstances is the advantage of a highly developed system of technical education. She trains her chemists to the highest degree of efficiency, and, without any advantage in raw materials, takes the lead as a producer of chemicals and as a consumer of chemical products in the scientific development of industrial processes,—witness the Badische Anilin und Soda Fabrik, the greatest of aniline dye manufacturers, and the Krupp Works at Essen, unexcelled in the manufacture of steel products. She trains her labor for the textile industry in trade-schools, and rivals England and France in the manufacture of a grade of textiles which the United States cannot approach,—from raw cotton furnished by the United States. She trains her bank clerks in technical schools, and banking institutions in the United States send for them to take positions at the head of foreign exchange departments. She trains her salesmen in these technical schools and they set out with a knowledge of the languages, customs, tastes, and peculiarities of their markets.<sup>1</sup> Competing

<sup>1</sup> For example, *Monthly Consular Reports of the United States*, no. 285, p. 786; no. 287, p. 160; no. 292, pp. 214, 298.

American salesmen have to come to them for assistance. It is only in the production of certain standardized, machine-made products, such as steel structures, that the American has any advantage.<sup>1</sup> In production of the great variety of articles for which there is growing demand in markets now being developed, the United States is at a disadvantage, and in the technique of salesmanship is decidedly inferior.

Certainly it is not the part of wisdom for the United States to permit any advantage she may have in the possession of raw materials to be neutralized in her competition in the world's markets by the superior skill of her rivals in manufacturing and in selling. Let the people of the United States contemplate all her immense natural resources without falling into that dangerous state of complacent satisfaction noted by our German critics, but with a realization of the need of painstaking effort in training those about to enter industry to a point of superiority in industrial technique.

<sup>1</sup> Levy, *Die Stahlindustrie der Vereinigten Staaten*, pp. 310-315.



## IV

### *The Value of Industrial Education to Employer and to Employee*

THE reference which has been made to the confidence of the Germans in their system of industrial education as an offset to the advantages in resources possessed by the United States, has been intended to awaken readers interested in the success of the United States in world trade to a realization of the necessity for the development in the United States of an equally efficient educational system. It is now desirable to consider, on other grounds than that of securing increased efficiency in international competition, what may be the necessity for such a system of industrial education.

Interest in this question should be the same for the man already established in business and for the young man about to enter his employ. The former seeks the most efficient labor, whether in the shop, in the office, or on the road, whether mechanical labor or the labor of management, and is willing to pay each employee according to the value of his services. The young man looking forward to a business career must, in the majority of cases, begin as a laborer of one sort or another, and

is willing to offer the most efficient service of which he is capable for a remuneration proportioned to the value of that service. The self-interests of both employer and employee demand of the latter the same thing, — efficient service.

The conditions of efficient service are very different to-day from those of similar service a half or quarter century ago. Industrial changes have been so great that the problems confronting the young man entering business to-day require abilities of a different order. The characteristic feature of the industrial problem of the earlier generation was the demand for *force* — force in seizing the advantages offered by nature and in overcoming the obstacles to their attainment. The characteristic feature of industry to-day is the demand for ability to comprehend complex relations, to correlate without friction and without waste the factors of industry, to make of any industrial organization a smoothly-working machine.<sup>1</sup> Then it was the building of a railroad across the mountains, or the locating and exploiting of a tract of timber or a mine, regardless of waste, for nature was generous; to-day it is the development of organization, and the bringing into an harmonious whole the hundred and one different factors that enter

<sup>1</sup> F. A. Vanderlip, *Scribner's Magazine*, March, 1905, p. 339.

into an industrial institution. Then industry demanded in the young man, at as early an age as possible, energy and power, qualities developed by "experience"; to-day industry demands of the young man, in addition to and preliminary to experience, knowledge; knowledge obtained from the conscious, scientific study of principles derived from business experience.

Half a century ago, before the great development of means of communication, in the numerous relatively isolated and only partly settled sections of the country, the individual manufacturer or merchant in his small plant bought and made and sold for a local market. He was generally a pioneer in his market, with all the advantages which this situation implied. His profits were usually large, with a generous margin for error. The details of his business were relatively simple, whether in buying, in making, or in selling. For the average man, "experience" was a practicable and a satisfactory preparation. He did not enter a business already highly complex, as does the young man of to-day, and as his business became more complex, he grew in knowledge *pari passu*. He was in a position to acquire in an empirical way a thorough knowledge of the technique of his business, and of the social and other conditions of his

limited market. To-day, on the other hand, "experience," especially in the many highly developed lines of business, is not a sufficient teacher for the man of average calibre who aspires to a comprehensive knowledge of business. It is certainly invaluable, not to be dispensed with, but its teaching is far from sufficient. To rely on it alone would be, for the majority of young men, as foolish as for the student of medicine to rely upon hospital experience alone, or for the student of law upon desultory reading in an office.

Markets, when not world-wide and continent-wide, and a business is either directly, or indirectly through its dependence on numerous other businesses, sensitive to an incalculable number of climatic, social, political, and legal influences. This sensitiveness is increased with the widening of markets, with keener competition, and with the narrower margin of profits. There is no longer the former margin for error; "profits tend everywhere to a minimum, so that in the end the percentage of earnings on sales declines towards the level of existence," and a business must turn over its capital six, eight, or more times, in order to earn a living return.<sup>1</sup> So narrow is the margin of profits in many businesses that it has come to be recognized each

<sup>1</sup> Thomas L. Greene, *Corporation Finance*, pp. 1 and 2.

new year that increasing competition is likely to wipe out the profits secured under the conditions of the preceding year, and that those profits must be replaced by others resulting from superior management. A Marshal Oyama must know no more about the strategic points of his game and the thousand and one characteristics of his opponents and the field of action than must the business man, and the commander who waits for the acquisition of such information until the time of battle, wins no Liaoyang.

Not only has the young man entering business to-day more complex relations to understand than he would have had a quarter of a century ago, but he is placed in a less advantageous position for understanding them. Then division of labor did not confine him so narrowly; he was called upon from the first to enter into a greater variety of activities. Experience then was really experience; experience to-day is for the apprentice the doing of routine work. Routine work does not give broadness of view or develop broadness of mind. On the contrary, unless the apprentice comprehends the relations of his services to the whole, his routine work but narrows him and makes him an automaton. The average young man of to-day without a trained mind equipped with a previously acquired founda-

tion of facts, is not, in the narrow place to which division of labor assigns him, in a position to grasp the breadth and depth of his business. This was not so true of the young man of half a century ago, whose particular place was less narrowly defined and whose business had not developed its present-day breadth and depth.

A more careful consideration of these facts should make clear to the business man and to the young man looking forward to a business career, that under present industrial conditions an efficient system of industrial education would solve important problems for both. It should also make clear that under industrial conditions that are fast approaching, such a system of education will be a necessity.

## V

### *The Value of Industrial Education to Society and to the State*

REFERENCE has been made to the importance of industrial education to that group of enterprisers interested in achieving success for the United States in the neutral markets of the world; its importance to business men who in one voice complain, "I do not know where to turn to find a young man properly trained to come into my office who, by an appreciation of the problems which I have to face, can relieve me of a portion of responsibility";<sup>1</sup> and of its importance to those young men looking forward to the opportunity to silence such a complaint. But has it not an importance to society, because of society's relation to business activity?

A large number of the most serious problems perplexing society to-day arise out of the industrial situation. Municipalities are struggling with the problem of franchises, and the granting of a franchise is chiefly a business transaction between the people and an individual. States are struggling with the problem of corporate taxation, and the taxation of

<sup>1</sup> Davis R. Dewey, *Technology Review*, April, 1901.

corporations involves the adjustment of the rights of the people to the rights of a complex and delicate business organization. Both the states and the national government are concerned with difficult problems relating to the conservation of economic resources, such as the forestry and irrigation problems. The people as a whole are concerned on the one hand with retaining the economic benefits of large corporate organizations, and on the other hand with guarding against unjust and possibly immoral exploitation on the part of these organizations. It has been said that formal law has not developed as rapidly as has industrial activity, that out of the inapplicability of formulated legal principles to specific industrial activities, the possibility of unjust and immoral business enterprise has been taken advantage of, and that the great problem of the present is a readjustment of these two factors, — law and economic conditions.<sup>1</sup>

Such being the problems of our democratic society, the need for a clearer practical knowledge on the part of the public of the nature of industry to-day, is obvious. It is obvious also that there is need not only for a better general knowledge of such conditions, but for a larger body of unprejudiced and incorruptible experts capable of advising as to the influ-

<sup>1</sup> Henry C. Adams, *Economics and Jurisprudence*, *passim*.



ence of specific legislation on industrial activity. It has been often charged that the ablest young men entering industry are absorbed at once into the large corporate organizations; whether or not this be an exaggerated statement, it has been admitted by many whose opportunities for securing information are numerous, that concentrated wealth, seeking for investment, is unable to find men enough with the ability to apply these large sums to industrial purposes.<sup>1</sup> If such be the situation, it is not unreasonable to assert that the large corporations do attract the ablest men, and the salaries paid by such institutions are a strong evidence that the assertion is not only not unreasonable but correct. It is not likely that the unprejudiced judgment of the ablest men will be given to society, in the solution of questions of public policy, when the ablest men are in the service of the large corporations, and when the questions involve the adjustment of the rights of society as a whole to the rights of these corporations.

There is another practical relation between society as a whole and individuals engaged in industrial enterprise. With the increasing wealth of the people there has been an increasing fund for investment and an increasing number of small investors. These investors

<sup>1</sup> James B. Dill, *Pub. Mich. Pol. Sci. Ass'n*, June, 1903, p. 125.

have become the owners of the industrial property, while the management of the property of which they have become owners has passed almost from their control.<sup>1</sup> They are no longer in a position to judge by direct investigation of the management of the properties which represent their wealth. They are more and more dependent upon intelligent, unprejudiced advice as to the value of the institutions in which their wealth is ventured, in these their private relations, just as they are dependent on such advice in the public relations to which we have referred.

The situation seems to be, therefore, one in which there is an increasing need for the individual, as citizen and as investor, to pass judgment upon industrial problems; in which the industry giving rise to these problems is becoming more complex and difficult of comprehension; and in which the individual is more and more in need of able advice by a class of industrial specialists, numerous enough to make their average judgments safe, and independent enough to make them unprejudiced. Unfortunately, these industrial specialists are neither numerous nor independent.

Would a system of industrial education relieve what has been aptly termed "a scarcity

<sup>1</sup> Veblen, *Theory of Business Enterprise*, pp. 158, 159, and *passim*.

of business talent"?<sup>1</sup> Geniuses, it must be admitted, are born, not made; no system of education can create them. But an efficient system of industrial education can accomplish three things; it can raise the general average of intelligence; it can develop specialized talent; and it can offer the opportunity for genius to find itself. Acting as an instrument of selection, by presenting industrial facts in a way to make young men responsive, it can turn to industrial ends abilities of all grades, the abilities of average men, of talented men, and of geniuses, abilities that might otherwise waste themselves in activities to which they are less adapted.

<sup>1</sup> Henry C. Adams, *Pub. Am. Economic Ass'n*, vol. 5, no. 2, p. 104.

## VI

### *Efficiency of Industrial Education indicated by Experience*

THIS question of the value of industrial education requires more than deductive reasoning from the value of education in general. Has actual experience with such specialized education furnished the evidence that it can accomplish the results suggested in the preceding pages? Can it increase the technical efficiency of young men entering upon business careers, to the advantage of both the young man and his employer, and to the advantage of the United States in international competition? Can it raise the general intelligence as to industrial affairs, and develop a body of unprejudiced experts on industrial questions?

The experience of two peoples who have achieved remarkable development within recent years seems to answer this question in the affirmative. Reference has been made to the development of the German people. They themselves attribute the accomplishment of all these results to their system of industrial education,<sup>1</sup> and the more carefully those of us

<sup>1</sup> *Monthly Consular Reports of the United States*, no. 288, p. 132.

standing outside study the situation, the more convinced we are that the German's explanation is a true one. The same may be said of the Japanese. Their development has been not less remarkable, and it is to be attributed not less to technical education. For some years the Japanese have been sending young men abroad to secure training in the military, naval, and industrial arts. We have just witnessed the remarkable results of such training for war; the results of the similar training for industry are not forced by circumstances into so high a light, but they are not less significant.

The United States is not entirely without experience of her own. She has no general system of industrial education, like that of Western Europe. But she has had for some years institutions for technical training for certain careers, trade and engineering schools, and, for a few years past, schools of higher commercial education. Do these institutions show results that may throw light upon the value of industrial education?

So far as we are aware, no general study has been made of the data furnished by these industrial schools. Three or four isolated investigations have been made, however, with interesting results. In 1903 Mr. James M. Dodge, president of the Link Belt Engineering Company, and at that time president of



the American Society of Mechanical Engineers, published in "St. Nicholas,"<sup>1</sup> and afterwards repeated in a paper before the society of which he was president,<sup>2</sup> the results of such a study. He estimated the relative money value of technical training to mechanical labor, by comparing the weekly wages and the relative increase in weekly wages, of unskilled, shop-trained, trade-school trained, and technological-school trained employees. With respect to the method of securing the data, in a letter to the writer, he says:

. . . the data of my address on the "Money Value of Training" were obtained by investigating the records of the Link Belt Engineering Co. and of the Dodge Coal Storage Co. — the records covering a period of about fourteen years. I then had the figures compared with such records as I could obtain from my friends in somewhat similar lines of business, and for fear of being in error, made a reduction of about 10 % from what the actual statistics show.

The curves accompanying Mr. Dodge's article are reproduced in Chart I. Condensing his results, we find the following argument in favor of technical training for mechanical labor:

#### AVERAGE OF UNSKILLED GROUP

This group receives \$10 per week at twenty-two years of age, and does not advance much farther.

<sup>1</sup> November, 1903. <sup>2</sup> *Trans. of Am. Soc. of Mech. Eng'rs.* xxv.

## AVERAGE OF SHOP-TRAINED GROUP

The average of this group enters the shop at sixteen years of age at \$3 per week; advances steadily to \$9 at twenty; to \$13.20 at twenty-two years, six months; to \$15.80 at twenty-four, beyond which wage the average does not advance.

## AVERAGE OF TRADE-SCHOOL GROUP

The average man of this group enters the shop at nineteen years of age at \$12 per week; advances to \$15 at twenty years, six months; to \$16 at twenty-one years, six months; and to \$22 at twenty-five years. The data are lacking as to further progress, but according to Mr. Dodge, "the presumption is that this line would bear off more towards the horizontal, eventually paralleling the line of the shop-trained man, but much higher on the chart."

## AVERAGE OF TECHNOLOGICAL-SCHOOL GROUP

*(Massachusetts Institute of Technology, Columbia, Cornell, etc.)*

The average man enters the shop at twenty-two years of age at \$13 per week; advances steadily to \$32 at twenty-seven years; then at a less rapid rate to \$42 at thirty-two years.

Mr. Dodge's result, although criticised as being more favorable to the technological



graduate than is justified in the average case, is substantiated by a study of the careers of the graduates of the Worcester Polytechnic Institute in Electrical Engineering.<sup>1</sup> As the Department of electrical engineering had been established but eight years, data were available for that period only, but the authorities of the institution believed the data had been received from a large enough body of graduates to represent conditions fairly. The following results were obtained (Chart I):

#### AVERAGE OF GROUP WITHOUT GRADUATE STUDY

The average graduate enters business at a weekly wage of approximately \$10 at the age of twenty-two years, nine months; advances at an even rate to about \$21 at twenty-five, and \$38 at thirty.

#### AVERAGE OF GROUP WITH GRADUATE STUDY

The average man with graduate training enters business at a weekly wage of approximately \$10 at the age of twenty-three years, nine months; and advancing at even rate, passes the student without graduate training before he is twenty-six, and receives \$33 at twenty-eight, and \$50 at thirty-one.

<sup>1</sup> Undated pamphlet published by the Worcester Polytechnic Institute.

In "System" of December, 1904, appeared an article presenting the results of a similar investigation, by Mr. Herbert J. Hapgood, founder and president of Hapgood's. This study was suggested to Mr. Hapgood by Mr. Dodge's article, but the investigation was along entirely different lines. Interested in the value of college and university training for business, Mr. Hapgood divided the laborers represented into two classes, college and non-college men. In the article referred to he says:

It is based on data taken from the experience of a hundred business houses of various kinds, covering a period of three or four years. The weekly salaries marked on the chart are neither the high scale of cities like Chicago, nor the low rate of small towns, but are an attempted average for the whole country.

In a letter to the writer he adds:

The number of firms furnishing data was over 100, covering all parts of the country and practically every branch of business and technical work. The number of men in the service of these houses at present is over 15,000. In the case of a number of firms, the period of investigation was twelve to fifteen years, in others it was no longer than three years.

Mr. Hapgood's investigation presents the following facts (Chart I):

#### AVERAGE NON-COLLEGE GROUP

The average non-college man enters business at eighteen years of age at \$3 per week;

advances steadily to \$13.20 at about twenty-three; then at a less rapid rate to \$15 at twenty-six years, only twenty-five per cent advancing beyond this wage to any marked degree.

#### AVERAGE OF COLLEGE GROUP

The average of this group enters business at twenty-two years of age at \$9 per week; advances at a relatively rapid rate to \$16 at twenty-four; then less rapidly to \$22 at twenty-seven. The data do not permit conclusions as to further advancement, but 85 per cent of those included within the investigation were still advancing.

An unpublished study of the careers of the graduates of the Amos Tuck School of Administration and Finance, Dartmouth College, has to do with a somewhat different class of men. The Tuck School is a graduate school of business; its graduates, therefore, are not only college-trained men, but are men who have had an additional year of business training of a higher grade than would be possible for men without a previous college training. Inasmuch as the Tuck School had graduated but four classes at the time of this investigation, the number of careers investigated was small. The study resulted as follows (Chart I):

## TUCK SCHOOL GROUP

The graduates left the Tuck School and entered business at the median age of twenty-three years, six months, at the median wage of \$10 per week. From that point the advance was at a moderate rate to \$15.40 at twenty-six years, six months; then at a very rapid rate to a median wage of \$28.51 at twenty-seven years, six months. The first class having been out of the school but four years, data as to further advancement did not exist.

These studies, investigating different classes of labor, but each comparing trained with non-trained labor, arrive at identical conclusions,—that as indicated by wages, which is the expression of the employer's estimate of the value of the services purchased, labor which has been trained in a technical school is more efficient than that not so trained. Whether judged by absolute wage earned at a given age, or by rate of advancement, trade-school trained labor is more efficient than shop-trained labor; that which has received a college education more efficient than that which has not been so educated; and there are indications that that which has received, in addition to a liberal college education, special technical training of an advanced grade, is more efficient than any of the others.

This comparison is true not only for those entering engineering careers, but, as evidenced by the Hapgood and the Tuck School investigations, for those entering such careers as banking, insurance, railroading, commerce, and general business.

## **PART II**

### **OUTLINE OF A SYSTEM OF INDUSTRIAL EDUCATION FOR THE UNITED STATES**



## VII

*Fundamental Considerations — A System of Industrial Education must be adapted to the Existing Educational System and to the Nature of the Services for which it is intended to train*

ACCEPTING the validity of the arguments which have been presented in the preceding pages, one must recognize that the industrial situation in the United States demands the development of a system of technical training for young men entering trade and commerce. The development of this institution, which is superior to any other in increasing industrial efficiency, if not demanded as a matter of necessity, is at least desirable as a matter of precaution. It is now the purpose of this essay to consider the general conditions of the development of such a system of technical education, as well as some of the practical aspects of the problems involved. Preliminary to such a consideration, it is necessary to recall two fundamental facts of education.

In the first place, education is not only an instrument used by society for raising the general level of intelligence, but is also, as has



been suggested earlier in this essay, an instrument of social selection. No two individuals are born with identical abilities or with identical temperaments. All individuals cannot be equally successful in any given activities of life, nor can all become equally of utility to society in these activities. There is in every society and in every stage of civilization a process of selection continually in operation; but with no peoples is it operating so effectively as with those peoples who, by a highly developed system of public education, offer to its members equality of opportunity for self-realization. Equality of opportunity does not result in the absolute equality of individuals; it results in the development of differences where such differences constitute an integrating instead of a disintegrating social force. Equality of opportunity, expressed in a system of education which is broad as to the classes it reaches and broad as to the activities for which it trains, increases the probability that young men, with their varying natural abilities, will undergo a selection, reciprocal between society and the individual, which will develop them for those activities of life for which they are respectively adapted. It may be affirmed, therefore, that not only should a general system of public education offer equal opportunities of development to all

classes and for all activities, but that any branch of the general system which looks towards the development of individuals for a specific group of activities, should also offer opportunities to all classes and should offer the possibility of training for all the activities of the group. A system of industrial education, for instance, must not be a rigid, inflexible instrument, attempting to shape all the individuals it touches after the same image; it must accentuate differences of ability and of temperament.

In the second place, except in those rare instances of highly centralized states which are able to impose upon their peoples educational systems created *de novo*, such an institution must be the result of gradual development. When its scope is enlarged to meet new situations, to reach new classes or to train for new activities, this enlargement should be accomplished neither by creating new instruments unrelated to the general system, nor by wholly reconstructing the already existing system. This should be accomplished by developing new members which fit into the existing system and which become integral parts of it. This is especially true of the United States, for in spite of an original "freedom from inherited and over-conservative ideas," its people have a conservatism of their own. The

complacent satisfaction in things American is a species of conservatism. One expression of this is a satisfaction with the existing system of public education. Like an amendment to the Constitution, a reconstruction of this system or a radical adaptation of it to meet new conditions, would be practically impossible. Not even all enlightened opinion is convinced that the present institutions of education are not adequate enough for industrial training;<sup>1</sup> or that there are conditions demanding special schools for industrial education.

In view of these two general educational facts, the question of a method of education best suited for men entering upon trade and commerce must be considered as a relative one. It must be relative to the institutions already existing, which must be utilized and to which it must be adapted. It must also reach a large number of classes and train for a great number of industrial activities, for the field of trade and commerce is a comprehensive one. In fact it may reasonably be defined as including all forms of industrial services, except that of unskilled labor, for the great mass of young men entering business serve their apprenticeship as wage-earners. Their training must equip them for efficient service at the bottom, as well as for an efficient life-work at the top.

<sup>1</sup> *New York Evening Post*, editorial, March 15, 1904.

## VIII

### *Classification of Industrial Services*

A CLASSIFICATION of services demanded of those engaged in industrial activities is difficult. The analysis is difficult because of the many points of view that may be taken, and because, examined from any one point, classes shade one into another. The classification must, in the nature of things, be artificial, and there will be unavoidable cross-classification.

The groups of services to which a system of industrial education must be adapted, may be classified fundamentally according to the degree in which they are mechanical or managerial. The exact line between mechanical functions and managerial functions cannot be indicated. It may be safely said that on the one hand the function performed by the manager of a manufacturing institution is characteristically managerial, and that on the other hand the function performed by unskilled labor is characterized by its mechanical nature. Between these extremes exists a large number of functions each conspicuous for one or the other of these characteristics. Services may also be contrasted as pertaining to primary processes, such as the transformation of

raw material, or to mercantile processes, such as the selling of goods at retail and the office work of factories. They may be contrasted again according to the degree in which science is applied in the performance of the functions; the chemist in the laboratory of a steel plant may be contrasted with the workman who mixes under his direction the ore, coke, and limestone. Uniting these various principles, the accompanying classification may be presented (Chart II).

The upper left-hand triangle represents roughly the field of characteristically mechanical services; the lower right-hand triangle the field of managerial services. As indicated, management is not entirely absent in the upper field and mechanical labor not entirely absent in the lower. Skill in management does not imply the absence of technical skill; the latter is logically a condition precedent. Skill in management implies rather the absence of the exercise of technical functions and not of a knowledge of them. Of the classes falling in the middle of the rectangle is required the exercise of both mechanical and managerial skill.

It must also be observed that not only is there a lower and a higher order of services, judged by the presence or absence of ability for management, but also that in the field of

## **MECHANICAL**

### **I. UNSKILLED LABOR**

### **II. SKILLED LABOR**

1. **MECHANICAL**, such as  
Tool and Machine Workers  
Office Clerks  
Salesmen, etc.
2. **SCIENTIFIC**, such as  
Chemists  
Engineers  
Accountants  
Actuaries  
Foreign Exchange Clerks  
Factory Statisticians, etc.

## **MANAGERIAL**

### **III. MANAGERIAL LABOR — First Group**

Performing functions requiring mechanical skill and managerial ability, such as

Foremen  
Chief Clerks  
Department Managers  
Private Secretaries, etc.

### **IV. MANAGERIAL LABOR — Second Group**

In less immediate contact with mechanical processes, such as

Managers of larger Departments  
Secretaries, Treasurers, etc.

### **V. MANAGERIAL LABOR — Third Group**

Concerned with organization, harmonizing the factors of industry, finance, etc.; concerned with mechanical processes only in their fundamental relations.



Mechanical



Managerial

**CHART II.**

services characteristically mechanical and in the field characteristically managerial, there is a lower and a higher order. The clerk behind the counter, and the accountant in the office, represent different degrees of skill, as do the manager of a department in the department store and the manager of a great corporation.

To those who have given no thought to the division of labor in a modern industrial state, such a visualized analysis is astonishing. For such readers it will emphasize two points which have been made in this essay, — the complexity of modern industry, and the fact that the young man entering business to-day will be performing so specialized a service that his opportunity for acquiring breadth of view by “experience,” compared with that of his predecessor, will be extremely limited. It is through skilled labor of the mechanical sort that the majority of young men must advance to the rank of managerial labor, and the outlook afforded in the earlier positions is narrow. The young man cannot start with too great a capacity for perceiving relationships.

To another class of readers such a visualized analysis must be discouraging rather than astonishing, — to that class of readers of non-constructive mind who will question how any system of education can be developed to train

technically for all these functions. It is only necessary to recall to them that the problem involved is not one of creating *de novo* an instrument of training for a highly developed industrial state. It is simply the problem of increasing the skill of an already skillful people by increasing the efficiency of an already efficient educational system. It is necessary at this point to review our educational system, both as to its present training for industrial pursuits and as to its adaptability to more special industrial training.



## IX

### *Classification of Existing Educational Institutions — General and Industrial*

IT has been suggested that, because of the fact that natural growth has characterized the development of educational institutions in the United States, a system of training for trade and commerce must also be a result of growth, and particularly of growth out of the existing system. We cannot create *de novo* as have the Germans. It has also been suggested that, while there is nothing that can be called a system of industrial training, there do exist in the United States trade and commercial schools, and that the development of a system, if it be desirable, should recognize these schools because they indicate the lines of natural growth. It is necessary at this point, therefore, to consider the existing institutions on which as a base the special system should be reared. For our purpose a careful and detailed consideration is unnecessary, and would be superfluous in view of the excellent descriptions which are accessible to all.<sup>1</sup>

<sup>1</sup> Edmond J. James, *Commercial Education in the United States*; Cheesman A. Herrick, *Commercial Education*.

The general school system of the United States in its public nature is democratic and comprehensive. A rough classification presents the following:

1. Primary and grammar schools taking the child to the age of twelve or fourteen years.

2. Secondary schools, comprising high schools and academies, which take the student to sixteen or eighteen years of age. As at present organized, the curricula of these schools are designed to prepare for college and university work, although, recognizing the large number to whom further education is impossible, the curricula are beginning to be made more general.

3. Colleges and universities, varying greatly in efficiency, including the colleges of a denominational character in the Middle West, the colleges of New England, the older universities of the East and the state universities. These institutions take the student to about the age of twenty-two or twenty-three years.

4. The graduate schools of the universities of the above class, giving an additional period of from one to three years of specialized training.

This classification does not include agricultural colleges, normal schools, nor the professional schools of law and medicine, associated with the colleges or comprised within the universities.

Turning to the existing schools of trade and commerce, we find a more heterogeneous group:

1. Private commercial schools and business colleges, which do not pretend to offer an education the equivalent of that offered by high schools and academies, but which offer training in the more mechanical forms of business practice, for those students who are unable to continue a general education beyond the grammar school.<sup>1</sup> The subject-matter of these schools consists essentially of commercial mathematics, bookkeeping, penmanship, shorthand and typewriting.

2. The commercial schools and business colleges having been found to attract students who might continue the more liberal training of the public schools,<sup>2</sup> short commercial courses were introduced into the curricula of many high schools. Out of this beginning has grown the four-year commercial course<sup>3</sup> which has found its place in a few of the more advanced high schools. In some instances, such as the Central High School of Commerce of Philadelphia and the New York High School of Commerce, these commercial courses are offered in a separately organized institution, coördinate with the high school whose primary aim is to prepare for college.

<sup>1</sup> Herrick, p. 196.    <sup>2</sup> *Ibid.* p. 216.    <sup>3</sup> *Ibid.* pp. 216, 217.

The curricula of these schools unite much of the liberal subject-matter of the older high school with the commercial subject-matter of the business college, offering such studies as English, history, modern language, elementary science, elementary mathematics, elementary economics, commercial geography, bookkeeping, and shorthand.

3. There have appeared in recent years a few distinctly trade-schools, such as the Lowell Textile School, whose aim is to train for specific trades. These schools are not numerous, but the beginning is significant, as indicating a tendency to recognize the value of special training as a means of developing expert labor for specific trades. Belonging to schools of this class, but less formally organized, should be mentioned schools or courses of training offered by such manufacturing institutions as the Baldwin Locomotive Works.

4. Representing a grade of training between the commercial work of the commercial high school and the commercial work of the colleges and universities, there has appeared the New York University School of Commerce, Accounts, and Finance. As compared with the commercial high school it carries its students more deeply into the same class and into a more advanced class of commercial subjects; it develops bookkeeping, for instance, through

a four-year course into accounting, auditing, and even into special applications of the principles, as in the accountancy of investments. As compared with the commercial departments of the college and universities, except in accounting, its technical subject-matter is not so advanced, and it does not offer the liberalizing training of the social sciences.<sup>1</sup>

5. As early as 1881 the University of Pennsylvania, in the Wharton School, and more recently a number of universities — California, Chicago, Illinois, Michigan, Vermont, and Wisconsin — organized commercial courses coördinate with or as a part of the existing courses in liberal arts, and in many instances leading to the same bachelor's degree as the latter. Some of these courses extend through the four years of the college course and some through the last two and into a graduate year. The training of these courses is characterized by an attention to applied economics and the more general principles of business, and acquaints the students with the simpler methods and principles of such specialized forms of business as banking and transportation. Coördinate with these commercial courses of the universities, but enjoying the advantages of actually or practically separate organiza-

<sup>1</sup> Since the above was written a day course, more extended and more liberal, has been introduced.

tion, are the engineering schools of these institutions and such schools as the Massachusetts Institute of Technology and the Worcester Polytechnic Institute.

6. The Tuck School, associated with Dartmouth College, has organized its commercial work on a higher plane than the universities above named, requiring practically a college education for entrance, and then on the foundation thus afforded, offering a more thorough training in the more highly developed and technical forms of business, such as banking, insurance, transportation, and foreign commerce. It attempts to offer a training for business of the same grade as that offered by engineering, law, and medical schools for their respective fields. This school is coördinate with the graduate schools of the universities, but is distinctly professional, and is not of the nature of a graduate school of economics.

This classification of the existing institutions of commercial education in the United States indicates that there exists a system of general education reaching all classes, and the nucleus of a system of industrial training for all classes. In the light of the classification of industrial services for which training is desirable, as presented on an earlier page, what practical suggestions as to the development of such a general system present themselves?

## X

### *The Extension of the System of Specialized Industrial Schools*

HAVING in mind the classes that enter into the various grades of labor and the ages at which they enter, and recalling the analyses of the industrial functions and of the existing institutions of education presented in the preceding sections, one may agree with Mr. Herrick<sup>1</sup> that those for whom our plans should be made comprise three classes:

(1) Those who are compelled to take positions at fourteen or fifteen years, who at best complete the course of the elementary school through the grammar school, and some of whom can give a brief additional time to preparation for their life-work; (2) those who can give three or four years to additional training, who are able to complete the course of the secondary school; and (3) those who can yet give other years to higher training.

Slightly modifying Mr. Herrick's proposition, we may agree further that there should be (1) some form of continuous training for the first of these classes, of which it would be possible to take advantage while most of the time is spent in the factory or office; (2) schools of trade and commerce coördinate

<sup>1</sup> *Commercial Education*, p. 277.

with the high school for the second of these classes; and (3) institutions of college and professional-school rank, pursuing work more advanced and more specialized.

It is at once apparent that these three needs are met, however inefficiently, by the existing institutions for industrial education, and that they may be more efficiently met by a further development of these institutions. The immediate problem that confronts us therefore is: how may these existing institutions be developed so as better to meet these needs? This problem presents two phases: (1) How should the institutions of trade and commerce be organized so as to utilize the existing educational system, at the same time making industrial training possible to those who do not now continue formal study into the more advanced schools; and (2) what should be the aim and content of the curricula of the various grades of industrial schools?

In entering upon a consideration of the first of these phases one is compelled to take issue with one of Mr. Herrick's propositions: that special should not overshadow general instruction in secondary schools.<sup>1</sup> Mr. Herrick seems to have in mind secondary commercial schools, and to mean that whatever the aim and grade of the educational institution, the

<sup>1</sup> *Commercial Education*, p. 278.



fundamental consideration should be the general education of the youth or man, and that the special education for industrial service should always be secondary. It seems better to propose that the general training, which should be continued as long as the individual's circumstances will permit, should follow the course offered by the existing educational system, and that, whenever and wherever along the way the youth or man is compelled by his circumstances to turn his attention to fitting himself for the struggle of life to which those circumstances assign him, he should find at hand an instrument, direct and practical, to prepare him for his particular life-work. The liberal training, whether in the grammar or the high school, in the college or the university, should come first, and in the method and subject-matter should be truly and formally disciplinary and cultural; the special training should follow and be built upon the liberal training, and should be direct and practical as to its subject-matter. The former should be concerned with "tradition," the latter with "practice";<sup>1</sup> the former with the discipline of the mind, with the development of the character; the latter with the development of skill. Such a distinction in

<sup>1</sup> George Santayana, Oberlin College Commencement Address, June, 1904.

methods and aims would result in a greater ultimate efficiency.

Happy indeed should we be, were it possible to assume that to every individual is offered the choice of a long period of continuous training, and in that case one would hesitate to disagree with Mr. Herrick's proposition. But such is not the case. One of the serious educational problems of the day is that imposed by the fact that so many pupils are compelled to withdraw from formal training at the end of the elementary period, that the most of those who go on are compelled to withdraw at the end of the secondary period, and that only a few are able to continue to the end of formal training. Considering the great difference in the means of families, and the great difference in the aptitudes of youths and men; considering the fact that our system of free public education makes it possible for so many to begin a formal education who must sooner or later withdraw, one must insist that the assumption is false that industrial finishing schools, intensely practical and specialized, should not exist at frequent intervals along the highway of general education. Any other plan must leave a great number to be turned by the exigencies of life from this highway into the side roads of practical affairs, developed on the side of character, but with

no special skill for those activities that lie before them. From the primary grade to the doctor's degree there is in operation a process of selection, and at whatever point one is turned from the road there should be found a school for specialized training.

Proceeding upon the assumption, therefore, that while all individuals should enjoy as long a period of general education as possible, all are not able to do so; that individuals are compelled to withdraw at all points along the route; and that at whatever point along the route a group withdraws there should be found an institution for direct specialized training for life's work, one may construct the following schematic chart.

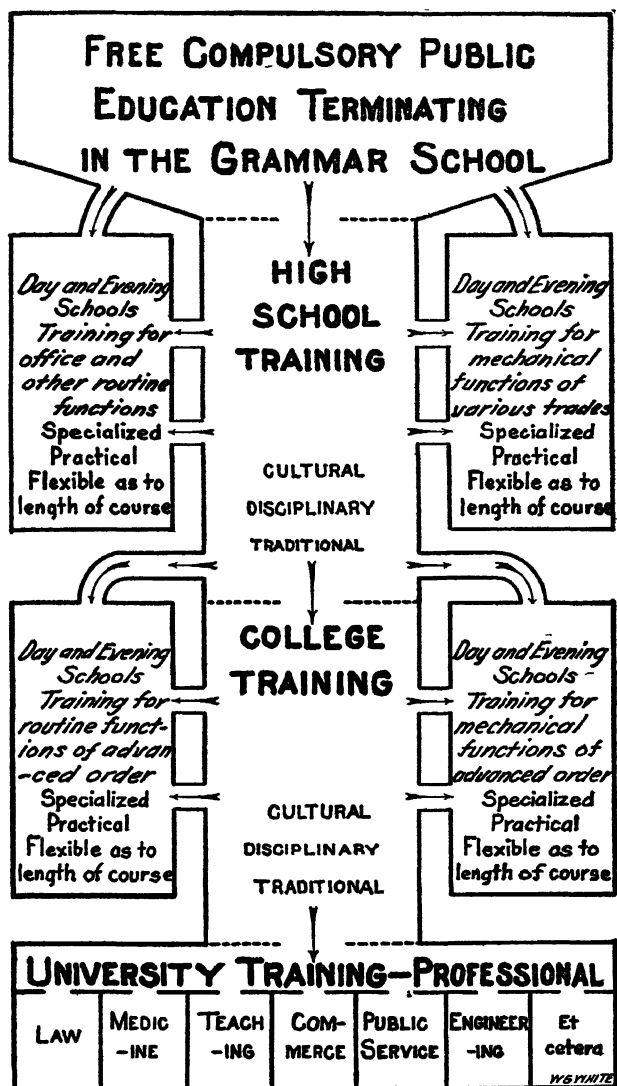


CHART III.

## XI

### *The Extension of the System of Specialized Industrial Schools (continued)*

LIKE all systems presented in a formal classification, the one here outlined seems at first glance rigid and ill-adapted to complex conditions. The chief reasons for its recommendation, nevertheless, are, first, it is adapted to meet the requirements of training for the many classes of individuals entering industrial life; second, it is adapted to train for all classes of industrial services; and third, it is adjustable to the existing system of general education. It should be remarked also, that the divisions indicated are logical rather than institutional, and that training for classes of services here differentiated may be offered by a single institution. The purpose of this scheme is to emphasize the idea of distinct practical training for distinct functions, not to suggest a separate institution for each different line of training. On the other hand, a fundamental idea of the theory here presented is, that industrial training as a whole should be offered by institutions organized separately from the institutions of the general educational system. An inquiry as to whether the industrial schools

should be private or public or both does not fall within the purpose of this essay.

Examining the chart, it is apparent that the scheme recognizes that a large number of pupils are unable to continue a formal education beyond the grammar school. Speaking broadly, the members of this class must take their place in the rank of relatively unskilled labor. With a suitable training for some industrial service in addition to the primary training of the public school, they may, however, find a place in the very front rank of the relatively unskilled group, and may even, as compared with the factory labor of to-day, become relatively skilled labor. The reason why children of this class withdraw before receiving a high school training is in most cases either the limited resources of the parents, or dissatisfaction of the parents or of the child, with an "unpractical schooling." It is probable that were there a variety of industrial schools offering training for specific trades, the majority of these youths would be attracted to them and their parents would find it possible to afford them the additional technical instruction. In the system suggested there is offered for such, first, the trade-school, a school offering a brief training for some definite trade, — in the textile mill or the machine-shop, or for carpentering and cabinet-

making. There is offered, second, a primary commercial school, similar to the German *Kaufmännische Fortbildungsschulen*, or our own commercial high schools, training the youth for office-work in mercantile or manufacturing institutions. Schools of this order should be organized to carry on simultaneously day instruction for youths able to give all day to attendance, and evening instruction for youths serving their apprenticeship at the same time in some trade. These trade and commercial schools are coördinate in rank, it will be observed, with the high school of the general system. Their courses should be organized, however, with a flexibility that would permit as long a period as four years or as short a period as one year of technical training.

While it should be the aim of the state to decrease the number of those compelled to withdraw from the public schools at the end of the primary period, as long as there is a considerable class of youths who must withdraw, as is the case, for example, in the manufacturing cities of the Atlantic States, the opportunity for a technical training should be afforded.

For those youths able to complete the secondary period of general education, the system suggested provides a higher grade of

technical instruction. The trade and commercial schools of this rank should also afford day and evening instruction for those youths respectively who are and are not able to give all their time to the continuation of technical training. With regard to those students who are now compelled to withdraw upon completion of the high school course, it may be said, as was said of the group above, that, a technical training made possible, many parents would find themselves able to afford it for their sons, and many sons would find themselves inclined towards a further education. On the basis of a longer period of formal discipline and of a wider knowledge of facts, such schools should offer training of an advanced order, similar to that offered by such institutions as the Worcester Polytechnic Institute in engineering, or the New York University School of Commerce, Accounts, and Finance in accounting and auditing, or the *Handelslehranstalt* of Leipzig.

Schools of this grade, it will be observed, are coördinate with the average college and university. It will be observed also that training of this rank is not provided in the existing commercial courses offered by six or eight of our leading universities. While later in the discussion there will be recognized a certain value in the commercial training offered in



these institutions, at this point, when the ideal system of greatest efficiency is being considered, it is necessary to adhere to the fundamental proposition of this essay, that the industrial school, of whatever rank in the scale, must have that intensely practical and professional characteristic made possible only by the separate organization. One of the reasons for the success with which Germany has built up so efficient a system of industrial education is her attitude toward the occupations of trade and commerce as professions. The weaving of commercial courses into the courses of liberal arts in our universities does not tend to assist the development of the professional esprit.

At the apex of the pyramid of our general educational system, we find the college and the university. An increasing number<sup>1</sup> of men intending to enter business pursue their formal training through the four years of higher education. This practice received its impetus probably from the sons of the leisure class whose business means the care of inherited wealth, a business not so exacting as to deprive them of social enjoyments. Gradually, with the widening of the university curriculum, it was found that the university training was valuable in developing business

<sup>1</sup> *World's Work*, May, 1904, p. 4769.

ability, and a custom which originated for social purposes has developed into a custom for business training. The adaptability, originality, and broadness of mind developed by the university training, have been tested by the complex situations of modern business, and have not been found wanting.

The system here presented provides for specialized schools coördinate with the graduate schools of preparation for the teaching, medical, engineering, and legal professions. Consistency has been maintained to the end of the scheme, for at this stage it is proposed that the training for the business profession shall follow the college training in the arts and sciences, shall be in fact a training, specialized and practical, with direct reference to life's work. The question arises, is there a body of training, of a practical nature, for the business career, so advanced and specialized as to require its deferment until a foundation has been laid in the college and university arts course? A moment's consideration will convince one that there is.

It is a well-known by-word among those engaged on the actuarial side of the insurance profession that it is impossible to open the covers of the "Institute of Actuaries' Text-Book" without a knowledge of calculus. This exaggerated statement does not convey the

full truth as to the high degree of technical skill required to become proficient in that profession. The mastering of the technique of this profession, which involves the application to an industrial activity of the theories of probability and of compound interest, requires a thorough preparation in mathematics, a preparation which can be secured only in institutions of college rank. This on the side of method only. In addition, for that sound understanding of the nature of the data to which the method must be applied, — not hard, well-defined facts, but the elusive, ever-changing facts of the social life, — there is required that clearness of the perception of relationships which can be acquired by the average man only through the formal training offered by higher education.

The same may be said of certain specialized forms of banking, if not of banking generally. A graduate of a school of the rank of the one under discussion was asked what was the most difficult subject he had pursued in his career as a student. His reply came promptly, — “Foreign exchange.” Further questions elicited the opinion that but little could have been accomplished in his study without the basis of the college training; he asserted, in fact, that he had not mastered the subject very thoroughly with his additional year of

specialized study. Banking institutions of the United States as a rule intrust the buying of foreign exchange only to clerks who have received their training in the commercial schools of equivalent rank in Europe.<sup>1</sup>

As a third illustration we may cite the banks and special institutions engaged in the buying and selling of bonds. Ability of the highest order is required for very great advancement in the services of such institutions, especially on that side concerned with the purchase of the bonds which they offer for sale. The ability to estimate the value of bonds by determining the value of the properties on which they rest, is acquired only by a training in corporation finance, a training that yields the best results when approached with faculties which are developed by a thorough study of economics. In like manner we might examine the requirements of the business concerned with transportation and with international trading. There is no doubt in our judgment about the call for services of this high order from business in the United States to-day.

<sup>1</sup> Cf. Herrick, pp. 86 ff. for a brief description of German schools of equivalent rank. For details of curricula, cf. *Handels-Hochschul-Nachrichten*, March, 1905, pp. 240 ff.

## XII

### *The Curricula of the Schools of the Extended System*

IN organizing the curriculum of an industrial school, regard must be had for the general equipment of the classes of students it receives, for the classes of society from which they come, for the industrial characteristics of the region in which it is located, and for the nature and state of the businesses for which it is intended to train. For this reason, to suggest a hard and fast curriculum would not be wise; each curriculum should be determined with reference to local conditions. It is the purpose, therefore, in this consideration of the subject, to give attention only to general principles.

The aim of industrial education as a social institution, technical efficiency, should be found expressed with especial clearness in the aims of its curricula. Formal discipline and culture as an aim should be left to the general system. At whatever point along the way the youth turns from the highway of general education to the side road of industrial education, he should leave general training for specialized training. The technical efficiency,

however, at which the specialized curriculum should aim must not be conceived too narrowly. It should embrace at least a twofold efficiency; efficiency in performing technical, mechanical, and mental processes, and efficiency in forming judgments in technical affairs. The second part of this definition explains the place, for instance, of history and economics in the curricula of industrial schools.

The first general principle to be observed is that the curriculum should have such subject-matter and be so organized as to promote the professional esprit. Besides making the subject-matter relate directly to the career for which the student is training, this result may be accomplished in three ways. First, the curriculum of the industrial school should have a distinct organization, separate from the organization of schools with other aims with which it may be associated. This does not mean that, for a few subjects, students of the two schools may not attend the same classes; but such identity should be avoided as far as possible. The professional spirit resulting from a distinct identity should not be sacrificed to economy. Second, the corps of instructors of the industrial school should be as distinct as possible, and should be thoroughly trained for instruction in technical

subjects. Broad general knowledge, fullness of technical knowledge, enthusiasm as a teacher and the professional spirit should be the qualifications sought. Third, the influence of the curriculum should be disciplinary in its own way, not only as to its influence on the methods of teaching and studying, but also as making for enthusiasm for work on the part of the student. In the curricula of the schools of the general system, recognition should be given to the value of activities not related to instruction, but when the student has entered upon his training for work, he should be inspired to make that training a business.

The second general principle to be proposed is that the subject-matter of the curriculum should be practical and technical. It should be descriptive rather than historical, practical rather than theoretical. It should not be understood as advocating the use of artificial money and other toys of so-called courses in "business practice"; for students who have left the grammar schools, teaching by such methods is of doubtful value. Neither does it imply that the historical and the theoretical should have no place in the curriculum, nor that many subjects that are considered by students as merely theoretical have no value as making for technical efficiency. For its purpose,

those courses may be considered as technical that make for skill in performing the mechanical and mental processes involved in the routine of one's business; that give a knowledge of the principles and facts related to one's business; and that develop the power of judgment in situations arising in one's business quickly and accurately, and of determining lines of action in accordance with these judgments. The second general principle insists that the special shall dominate the curriculum.<sup>1</sup>

Recent observers of the German educational system have criticised its curricula as being so technical as to defeat in part its very aim by making the German student, although scientific, narrow and lacking in initiative. They have warned American educators against a similar error. They overlook the fact that this narrowness and lack of initiative are the results of the German's entire social environment, and not merely of his educational methods. Granting, however, that an extremely technical curriculum may intensify these characteristics, it does not follow that the same curriculum would have the same results when applied to the American youth. That common American temperament which is the very opposite of dependent, which relies upon natural ability

<sup>1</sup> Cf. pp. 58 ff.



and is impatient of laboriously acquired knowledge, needs the corrective of an intensely technical and scientific training. The German youth, to correct the influence of his social environment, needs more of the liberal in his curriculum; the American youth, to correct the influence of his social environment, needs more of the technical.

The third general principle is a more special statement of the second; the curriculum should be so comprehensive and flexible as to afford the student direct training for some specific occupation. Subjects presenting principles common to all business activity should be pursued by all students, but students should not be led to dip into first one and then another of the studies offered, covering the whole range in this manner with the idea that they are securing a technical training.

Unless the reader has followed carefully the presentation of these general principles, and has borne in mind fundamental principles previously presented, too early and too narrow specialization may seem to have been advocated. The intention has been, rather, to criticise the existing educational system and existing courses in commercial education, as encouraging too early and too narrow specialization. It seems desirable at this

point to summarize and repeat the thesis of this essay; that a general education, whose aim should be discipline and the development of character, should be pursued by all students *for as long a period as possible*, thereby developing the human-nature side and building the man before building the artisan and specialist; that the varying financial circumstances of families, the varying dispositions of parents, and the varying mental abilities of youths, bring it about that in all stages of the educational system individuals are withdrawing to take up life's work; that to promote industrial efficiency there should be at each stage of withdrawal industrial schools whose aim should be direct, and, in a liberal sense, practical, technical training. This industrial training should *not be woven into the curricula of the general educational system*, but should be separate, compact, and professional. The training of the man-side of the individual should not be impaired by injecting into it training for work; the training for work should not be weakened by having to carry the burden of training for culture.

The system of industrial education as a whole should be flexible and rational. The technical training of any youth at any stage should be determined by his natural ability and his previous acquirements. The training

of the earlier stages should be in the more general principles of business, and for the more general and less highly developed and specialized industrial functions; the training at the apex of the system should concern itself more deeply with the general principles of business, and should offer training for those functions demanding broad general knowledge and thorough technical knowledge of advanced and highly developed forms of business.

### XIII

#### *Managerial Ability and Training*

WHAT has been said about industrial efficiency has been said with technical efficiency in mind. Since presenting the analysis of industrial services little has been said about managerial ability, and nothing about training which might aim at developing it. The discussion of this subject has been deferred until the concluding section in order that the author's view might in that way be indicated, that the development of the aptitude for management is but indirectly related to formal training of any kind.

Managerial ability may be regarded from at least two points of view. It may be looked at subjectively, *i.e.* from the side of the individual exercising it, and objectively, *i.e.* from the side of the activities in which it is exercised. A consideration of it, approached from these two sides, throws much light on the question of training to develop managerial ability.

The first element that impresses one in considering the subjective side in an individual-psychological element. Successful management requires force and strength; the

individual must be of the motor rather than of the sensory class, must project himself rather than be the object of the projection of other selves. This does not mean that the subject must be of the physically aggressive class, of the boisterous, bullying class. There are many managers of the highest type, irresistible in their ability to impress themselves on others, with the bearing of unassumed gentleness and simplicity. It means that the subject possessing the ability at critical times of appreciating the situation in which he finds himself has the power of collecting himself, of determining what shall be done and of compelling, by force of will, the doing of it. The normal individual of the motor class possesses the fundamental temperamental qualification for managerial ability.

This temperamental characteristic is a fundamental condition to successful management, and because it is temperamental, training cannot produce it. The pedagogics of industrial education, like that of general education, must recognize temperamental differences in individuals. For this reason, training for management, if it be possible, should have to do only with those individuals placed by nature in the motor class.

The second element of managerial ability, considered from the same side, is a socially

produced characteristic, impossible of definition by a word. It is a composite characteristic involving adaptability, adjustability, and other abilities that arise from social contact and from a wideness of information, empirically acquired, that makes one at home in all situations. It is a social product, a product of the home, of games, of social activities, of travel, of the public schools, and of the college. It is a product of informal as much as of formal social training; of the captaincy of a baseball club or of the management of a college paper, as well as of the formal training of the high school and the college.

Leaving out of consideration the exceptional individual, — him in whom the motor characteristic is so strong as to be able to ignore the lack of the development of the social elements, — and having regard only for the normal individual of the motor type, it seems safe to say that there is no experience for the individual that so develops the quality that may find its expression in management, as college life, — the life of the classroom and the life outside. In the college if anywhere, where is found “the impact of young thought upon young thought, of fresh thought upon fresh thought, of hot thought upon hot thought,” the individual learns to adapt himself to other persons and to adjust himself to all situations.

That the college-trained man is able to light upon his feet, whatever happens, has become proverbial. His defects are of another sort. A great manager's estimate of this all-round development is indicated in the requirements of the Rhodes scholarships.

To bring out this second subjective element of managerial ability, therefore, the most useful instrument that society possesses is the high school and the college, with their social activities and their formal, cultural training. Believing that the high school does not alone afford a long enough training to bring the social forces into play in the development of ability for management, one cannot but be of the opinion that the value of the college as developing managerial ability should be recognized. Because of the value in this respect of such training, the establishment of commercial courses in the universities to which reference has been made, should be recognized as a step forward.<sup>1</sup> They afford a certain degree of technical training along with the training that develops this element of managerial ability. Their deficiencies lie in the fact that the technical element is not emphasized in the training, and that they do not concentrate the temperamental-social elements of managerial ability on their object.

<sup>1</sup> Cf. pp. 52 and 64.

This leads to a consideration of the objective side of that ability.

The temperamental factor and the socially developed factor, by themselves, do not constitute managerial ability. The ability for management is in a nebulous, uncertain state until it is made definite by expression in some concrete activity. One may speak of ability to manage with reference to a campaign, military or political, to a manufactory, to a department store, to railroad construction, or to industrial combination. One cannot conceive it without some such concrete reference. And such a concrete reference implies a thorough knowledge of that to which the reference is made. The thoroughness of such knowledge, — knowledge of the facts making up the situation to be managed, of the relation between these facts and of the significance of them, — not less than force of will and the ability to adjust one's self to all situations, determines the degree in which managerial ability is present. Force of will and adjustability may be present as conspicuously in a ward as in a national campaign; the complexity and largeness of the latter is what makes it the greater problem of management.

It is the necessity of a broad and deep knowledge of a situation that affords industrial education its opportunity for aiding in the



development of managerial ability. Its function is to supply a necessary factor, a thorough technical knowledge that is the basis of saneness of judgment. Training for business of itself cannot develop managerial ability, but it can make the other factors of that ability operative. It should not seek to develop the other factors, except incidentally; that should be left to other forces; it should exert its energy in producing technical skill, technical knowledge, and in making possible good judgments as to technical situations.

As in the past, we must rely on nature for the production of the temperamental characteristic; and on the home, the playground, the school, the club, and other group activities for the production of the socially developed characteristic. What education can do is to afford in the college social life and the college classroom the surest opportunity for acquiring this socially developed characteristic; and in the technical school, the surest opportunity for acquiring a thorough knowledge of the field for the exercise of the ability.

As a corollary to what has been said concerning managerial ability, for the completion of its development one should not look to the industrial schools of the lower order. They have not the foundation in the development of the natural and socially acquired charac-

teristics on which to work, and they have not the foundation in mental discipline and broad information on which to build the knowledge of advanced and specialized forms of business. For the most efficient managerial ability one should look to that development which comes from the long training of the grammar school, the high school, the college, and finally the advanced professional schools of commercial education.

Neither should one deceive one's self into imagining that managerial ability so developed will be fit to manifest itself at once, or will at once find the opportunity to manifest itself. The individual with the most thorough training must make his complete adjustment to the new environment after he has left the field of training for the field of labor. He must pass through his period of apprenticeship and acquire his experience of the narrower sort. But that period should be shortened because of his training, and he should be able to climb to those positions which are the goal of the earnest young business man's ambition.



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